



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/412,510	10/05/1999	KENJI ITOH	0756-2045	9753

7590

05/30/2006

SIXBEY FRIEDMAN LEEDOM & FERGUSON PC
8180 GREENSBORO DRIVE
SUITE 800
MCLEAN, VA 22102

EXAMINER

PADGETT, MARIANNE L

ART UNIT	PAPER NUMBER
----------	--------------

1762

DATE MAILED: 05/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/412,510

Applicant(s)

ITOH ET AL.

Examiner

Marianne L. Padgett

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 42 and 87-106 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 42 and 87-106 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

Art Unit: 1762

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/13/2006 has been entered.

It is noted that applicant's amendment essentially removes all subject matter that had been indicated allowable before the latest obviousness double patenting rejections were made, and reverts the subject matter to limitations similar to that treated in the original rejections. Therefore, while the claims could technically be considered nonresponsive, as they are changing from an etching process to a DLC coating process, they will be considered in this RCE, as they are related to previously considered subject matter.

It is further noted there's already a term disclaimer in this case over Patent Number 6,001,431, so this reference does not need to be reconsidered in view of the new claims, however all previously applied rejections, especially those involving carbon or DLC coatings, it need to be reconsidered for their renewed appropriateness. Also note, that due to similar broad wording in the original claims (which were canceled before initial examination), the most of the present new versions of the claims, do not appear to include new matter, but there too do appear to be some unsupported broadening the scope & enablement issues.

2. Claims 42, 87-88 & 92-106 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In the completely rewritten independent claim 42, the limitation of generating a plasma in the "form of a plane", where no orientation of this plane is required, nor is it required for the substrate to ever

Art Unit: 1762

pass-through or be touched by this plane, is generically supported by original claim 1, but support for being able to form a diamond-like-carbon (DLC) coating under this breath of conditions is not seen to be discussed (note that original claim 8 requires that the substrate be moved through the plasma), nor considering figure 2 & discussion of the technique depicted therein in examples 1 & 2, there was not found to be support/enablement for use of plasmas in the form of a plane in the scope claimed, such that it encompasses plasmas for example that form a plane parallel to the substrate. For these reasons it appears that these new limitations/new claims are so broad as to encompass New Matter. Also, while the specification does generically disclose a "plasma in the form of a plane" without any indication of orientation, no enablement for using plasma in any orientation other than depicted in figure 2, was found. With respect to figure 2, note that on page 14, reference number 109 is said to be "a linear one-dimensional high-density plasma region 109", which while contradictory (anything linear is two-dimensional, anything one-dimensional is only a point, and what is illustrated in figure 2 is drawn to show it to be three-dimensional!!!), does clearly indicate that the depicted plasma region 109 is the high-density part of the plasma, such that it may be inferred that lower density plasma regions are also present, but not illustrated, with the first full paragraph on page 15 indicating that the taught configuration produces a plasma confined to a limited area defined by the gas supply inlet, as opposed to "a conventional plasma region widely spread over the entire space between the electrodes".

While independent claims 92 & hundred have language that is inclusive of orientations as taught in the specification (see above), they do not necessitate planar plasma beams that are perpendicular to the substrate as are taught, since the language of claim 92 has no limitation on the orientation of the slits, with the only limitation on the plasma's shape being that it is "sheet-like beam-type" (indefinite as discussed below). Claim 100 is slightly better since it requires that the "plasma extends from the first electrode towards the second electrode", but towards is much broader than perpendicular, or even essentially perpendicular, such that it may include all angles, i.e. oblique angles, acute angles & perpendicular

Art Unit: 1762

orientations, which is not disclosed or enabled by the original disclosure, hence inclusive of New Matter.

Note that claims 95 & 103, which discussed cross-sections parallel to the substrate, do not compensate for this problem, since one may take a cross-section through a beam that is not parallel to the longitudinal axis of the beam.

3. The disclosure is objected to because of the following informalities: on page 10, line 2 of the specification, it is noted that "cas" appears to be a misspelling (possibly due to the poor quality of the copy scanned into the electronic file), such that the beginning of that sentence should read --In the case where--. Line 2 on page 14 also appears to have words missing letters in the scanned file, that should probably be --also-- & --functions--, and similarly letters are missing on the first two lines & second to last on page 16. The scanned specification has not been thoroughly reviewed for such problems, and it is recommended that applicants do so.

It is noted in the discussion of figure 2, on the paragraph bridging pages 13-14, the first line on page 14 refers to "vacuum vessel 101", however figure 2 does not have this reference number (nor apparently the vessel), which is only shown in the prior art figures 1(A-B). The third full paragraph on page 14 similarly refers to "material supply system 108" which is not in figure 2

Appropriate correction is required.

4. Claims 42, 87-89, 90, 91 & 92-106 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 42, 87-98 & 91, the limitation "a plasma in the form of a plane" is of uncertain scope due to the fact that a plane is a 2-dimensional mathematical construct with no depth or thickness, however the claims are dealing with plasma that exists in the real world, so it is unclear or ambiguous what scope should be applied to this claimed "plane", the actual meaning of the word or that the plasma should be considered to have a planar shape or form with an unknown thickness (not actually claimed). Note that

Art Unit: 1762

claimed 90 is not included in this rejection, because it clearly defines the cross-section of the plane where the plane's orientation with respect to the substrate and the cross-section are defined. Since this configuration is not clear in independent claim 42, in the similar limitation of claim 87, the claimed cross-section could be taken in the direction parallel to the plane, which could also be parallel to the substrate, thus does not resolve this issue in this broader claim (this assumes real world, such that there is a thickness to take the cross-section through). Note that a mathematical plane, being two-dimensional can only have a cross-section taken perpendicularly through it be a line, such that only the value of infinity is possible for the claimed ratio, which makes application of the limitation of claim 90 to the plane unclear or partially impossible, without clarification of the "plane" terminology.

Use of terminology employing "-like" or "-type" is generally unacceptable in patent language, because it is considered vague and indefinite due to the uncertainty in the scope of the resultant term. In these claims particularly see "sheet-like" and "beam-type" in independent claims 92 & 100, where it is uncertain how the plasma is like a sheet, but not a sheet or how exactly it is related to a beam. Note that this sort of terminology can be considered acceptable in instances where it forms an art recognized phrase, such as "diamond-like carbon", which is known in the art to be defined by certain characteristics which it shares with diamond, but does not have all of diamonds structure and properties, hence it is truly like diamond in some aspects, but is not diamond.

In claims 92 & 100 the "forming..." step is ambiguous, because as written it is uncertain whether the requirement is for "forming the diamond like carbon film... by a plasma chemical vapor deposition using..." or whether "a magnetic layer formed... by a plasma..." is the intent, since the plasma could be referring back to formation of either the DLC film or the magnetic layer.

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would

Art Unit: 1762

have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 42 & 87-106 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 6,001,432 (Yamasaki et al.) in view of admitted prior art on pages 2 - 4 (First full paragraph) or further into Takahashi et al. (5,104,685).

In Yamasaki et al. (432), the claims are directed to localize plasmas with elongated cross sections parallel to the substrate, which may be moved in the direction orthogonal to the substrate movement, in order to deposit carbon on the substrate, where the substrate may be magnetic disks or magnetic tapes &

where the carbon film may have a Vickers hardness of 300-4000 kg/mm². The plasmas may be produced using opposed electrodes with gaps as claimed. While this patented claims use different nomenclature, they are effectively describing substantially similar and overlapping structures plasma beams structures, that appear to be the same as the planar plasma beams that appear to be intended in the present claims, hence constitute obvious variations thereon. The patent claims' limitations of magnetic disks or tapes differs by not requiring the magnetic material to be a layer on another substrate or listing specific magnetic materials, however such structures & materials are typically how magnetic disks and tapes are constructed, hence would have been obvious to one of ordinary skill in the art to employ such typical structures for the substrates claimed in the (432) patent, especially in light of applicants' admitted prior art which says they are conventional. The patented claims also differ by not requiring a specific carbon source and only requiring the deposit film to comprise carbon, possibly with a specified range of hardness, hence are not specific to DLC deposits, but are inclusive of DLC films, where the patent's claimed hardness is suggestive of DLC coatings, especially in light of the patent's background teachings on column 1, lines 42-56 which relate hardness to properties related to those that define DLC materials. Also, in view of the admitted prior art, it would have been further obvious to one of ordinary skill in the art to apply a DLC coating, for the specific type of carbon coating on a magnetic substrate, using precursors as presently claimed (depending claims), since the claimed precursor materials are known DLC precursors in analogous deposition processes (CVD), since it is conventional to apply DLC films as protective coatings, including for low-temperature substrates & using PECVD is known, and since they would have been expected to produce coatings consistent with the requirements of the Yamasaki et al. claims via a process configuration that has no clear necessarily distinguishing features.

Dependent claims concerning vacuum pressure and use of an electrically insulating cover on electrode(s), are considered further obvious variations as the former would have been optimized depending on over all apparatus configuration in size, as well as desired effects on plasma density, while

Art Unit: 1762

the latter is a standard electrode construction employed for various reasons inclusive of protection of the electrode structure and prevention of contamination during processing, etc.

The use of DLC as a protective coating deposited by plasmas CVD on magnetic recording material on a nonmagnetic substrate is further obvious as desirable in view of Takahashi et al. (discussed in section 6 of paper 13, mailed 5/11/2001), as this reference explicitly shows the plasma deposition on claimed substrate material is desired for providing a protective & durable surface thereon to improve the performance and practical use of magnetic recording media (column 1, lines 10-18 & column 4, lines 45-column 5, line 5, etc.).

7. Claims 42 & 87-88 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-68 of U.S. Patent No. 6,183,816 B1 (Yamasaki et al.). Although the conflicting claims are not identical, they are not patentably distinct from each other because present claim 42 and its dependence are inclusive of plasmas parallel to the substrate, such that the claims of the (816) Yamasaki et al. patent are considered to claim a more specific process which is encompassed by applicants broader claims. The patent claims may plasma deposit DLC coating on a magnetic material on a substrate, where the interval between electrodes that may be substantially parallel is 6 mm or less, therefore the plasma thereby produced most certainly may be considered to be planar, hence a plane in the probable meaning of the applicant's limitation, thus providing a specific means of accomplishing the present claims. The shape of a cross-section of such a plasma taken parallel to the substrate would depend on the particular shape of the substrate, where treatment of typical magnetic medium such as tapes would have been expected to be treated in plasmas in elongated plasma spaces to match the substrate shape, thus lacking a more specific context (note above discussions) this claim is considered only an obvious variation on the overall process.

Art Unit: 1762

The claims of the 816 patent do not have any language that in that necessitates plasma beams form through slits or planar plasmas perpendicular to substrates, so the other new claims were not included in this rejection.

8. Claims 42 & 87-106 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 5,766,696 (Itoh et al.) in view of admitted prior art on pages 2 - 4(First full paragraph) or further into Takahashi et al. (5,104,685) for reasons analogous to those in sections 6 & 7 above. Note in each of the plural sets of first and second electrodes claimed in this patent (696) may individually or together form planar plasmas in the gap between the two electrodes which is not larger than 10 mm.

9. Claims 42 & 87-16 provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 42-44, 53-58, 60-62, 64-69 of copending Application No. 09/438581 in view of admitted prior art on pages 2 - 4(First full paragraph), and further into Takahashi et al. (5,104,685), substantially as discussed in section 6 above.

The claims of this copending application have language similar to the claims of the 6001432 Yamasaki et al. patent, thus the reasons for obviousness are substantially similar to those discussed above, but with the additional difference that the substrates of this copending Patton are generic and not specified to be magnetic or have a magnetic layer thereon, however the obviousness of DLC coatings on such substrates was also discussed above with respect to Takahashi et al., which is also relevant here.

This is a provisional obviousness-type double patenting rejection.

10. Claims 42 & 87-88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. in view of Venkataramanan et al. (4647512), both discussed in section 6 of paper 13, mailed 511/2001.

Takahashi et al. is also discussed above with respect to present claims, and it is further noted that the disclosure therein of plasma CVD of DLC coatings on claimed substrates differs from the present

Art Unit: 1762

claims in that the necessarily localized plasma of Takahashi, while essentially tangential to the substrate surface due to the conformal configuration of the electrode that supplies the gas to the plasma with the substrate supporting electrode/drum, has an overall curve shaped due to the curve caused by the use of a cylindrical drum as a substrate support, however the plasma's shape approximates planar over short distances and the overall curve shape is not significant to the effects of the deposition, as can be seen from the teachings of Venkataramanan et al, who have an analogous configuration of parallel electrode surfaces, that are also closely spaced particularly with an exemplified spacing gap of 5 mm, which is also used to produce DLC coatings, that are said to have superior properties due to consistency that is achieved using their electrode configuration. Hence, it would have been obvious to one of ordinary skill in the art to use any of a range of configurations from that depicted in Takahashi et al. to that shown in Venkataramanan et al, i.e. locally planar but gently curved to completely planar, as long as one maintained the closely spaced electrode configuration with controlled gas input in order to provide for consistent, thus superior DLC deposition which would be expected to provide superior protector properties on Takahashi's magnetic media.

11. Applicant's arguments filed 3/13/2006 have been fully considered but they are not persuasive. Applicant's amendments have thrown out all the language that clarify the process from previous prosecution, hence hardly result in allowable subject matter but reintroduce problems in a paraphrased manner. It is also noted that applicants' sweeping statement that "... claims of the '432 patent, and that the Jensen et al. and Kamaji et al. patents fail to remedy these deficiencies", fails to clearly state exactly what deficiencies for these radically different claims, they are talking about, hence can't be convincing of anything, especially as the present claims are now more similar to those of the Yamasaki et al. (432) patent.

Applicant's arguments with respect to claims 42 & 87-106 have been considered but are moot in view of the new ground(s) of rejection.

Art Unit: 1762

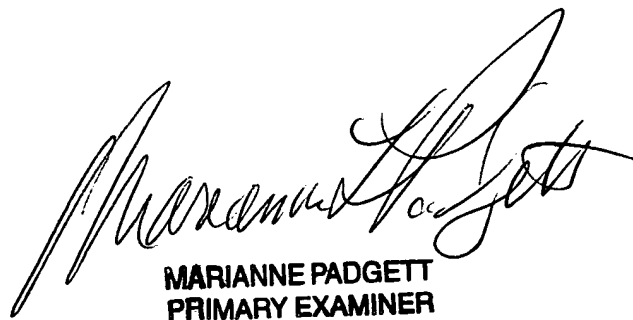
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marianne L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on M-F from about 8:30 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks, can be reached at (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MLP/dictation software

5/25-26/2006



MARIANNE PADGETT
PRIMARY EXAMINER